

**STATEMENT OF ANDREW N. SHEPARD ON H.R. 3835 BEFORE THE HOUSE
COMMITTEE ON SCIENCE, SUBCOMMITTEE ON ENVIRONMENT,
TECHNOLOGY AND STANDARDS, 108th Congress**

JULY 27, 2006

Mr. Chairman and members of the Committee, I am pleased to appear before you concerning H. R. 3835 entitled the “National Exploration Program Act” in Title I, and the “NOAA Undersea Research Program Act of 2005” in Title II. I am grateful to the Committee for your recognition of the importance and need for enhanced support and integration of ocean exploration and undersea research. I have been working for NOAA since 1978, the last 22 years with the NOAA Undersea Research Program. In that time, I have seen the program go through many evolutions to better serve the nation—we are on the verge of another such evolution.

Why do we need specialized undersea research programs?

This a two part question: 1) why do we need to dive?; and 2) why are dedicated programs needed? Mysteriously to me, we often must justify why we endure risk and spend time and money going underwater to study oceans. No one doubts the need to study forest ecology or demographics of a city by entering them! Oceanography has traditionally relied on surface ships, and in recent decades, remote sensing, largely as these approaches are traditional or accessible. We are entering a new age for ocean science: ecology is not a fringe discipline, but the core of the “ecosystem approach to management”; an electronic age when data and information can flow at unprecedented rates using robotics and sensors for a vast array of new ocean applications. The Undersea Research Program’s technology developments and operations have changed the face of ocean science; the Long-term Ecological Observatory (LEO15) off New Jersey is a prototype coastal ocean observing system that early recognized the importance of quality dive support. Nitrox scuba diving is now supported by most dive shops and academic dive lockers in the country, spurred primarily by NURP development activities.

Why do we need dedicated programs? Simply stated, NOAA needs specialized undersea research programs as diving can be risky and complex. Most marine science programs cannot afford to sustain the technologies and expertise required to keep up evolving advanced diving techniques and technologies, which include robots, submarines, advanced scuba, and variety of related sampling tools.

Why have regional presences?

The practice of regionally located “*centers of expertise*” is common in many national programs, for example, Department of Energy’s National Labs or National Institute of Health Centers of Excellence. Their proven success lies partly in economy of scale and common access to pools of specialized resources. NURP provides such specialized undersea assets on over 11,000 scientific dives per year, involving over 200 separate partnering institutes, including 27 U.S. states (**Attachment**). This mostly regional community functions as a vital research capacity needed to address many of NOAA’s ocean science and management priorities. The concept of peer review-driven, regionally customized components of a national program encourages quality,

relevance, productivity, and cost-effectiveness. The NURP refereed publication rate mirrors academia as a whole, which is ten times higher than government as a whole, at about 10% of the cost per publication, in part due to the invaluable contributions of teams of scientists, technologists, and students.

Regional presence enhances *public outreach and extension*. We actively participate in region-based management activities, such as the fishery management councils, state coastal management forums, and sanctuary and reserve advisory boards. It is not just a matter of saving money on travel; we offer local knowledge and expertise that is hard to sustain through a single national program. We want to sustain high-quality useful science, but we also need to make it available to managers and the people who live on the coasts.

Why are NURP, OE and NSF all supporting undersea science?

It is instructive to consider how these programs arose and their missions. **NSF** was established in 1950 as “the federal government's only agency dedicated to the support of education and fundamental research in all scientific and engineering disciplines. Its mission is “to ensure that the United States maintains leadership in scientific discovery and the development of new technologies” (<http://www.nsf.gov/about/history/>). By 1954, studies ranging from use of high speed computing for oceanography and deep sea bottom cores began. Since inception but especially in recent decades, NSF’s peer review process heavily favors hypothesis-driven, fundamental research. While this culture meets the NSF mission, it does not necessarily encourage exploratory endeavors or applied research.

NOAA was established in 1970, pursuant to the Stratton Commission, essentially by combining the United States Coast and Geodetic Survey (formed in 1807), the Weather Bureau (formed in 1870), and the Bureau of Commercial Fisheries (formed in 1871) (<http://www.history.noaa.gov/noaa.html>). As stated by President Nixon in his address to Congress that accompanied the related Reorganization Plan (Number 4 of 1970), “We face a compelling need for exploration and development leading to the intelligent use of our marine resources. We must understand the nature of these resources, and assure their development without either contaminating the marine environment or upsetting its balance.”

The first undersea science and technology program in NOAA, the Manned Undersea Science and Technology program, soon followed in 1971. In 1980, the National Research Council endorsed the need for such a program in NOAA, but expanded it to become the **NURP** model with regional centers of expertise. For its first 20 years, NURP research spanned the spectrum of undersea science from deep exploration to shallow applied science, such as coral reef studies. However, as funding was cut drastically in 1996, more expensive exploration and new technology developments were compromised to sustain the applied scientific dive programs most needed by NOAA.

In 2000, with a mandate from a Presidential Executive Order, a special panel led by the NURP Director, Ms. Barbara Moore, produced a report, “Discovering Earth’s Final Frontier: A U.S. Strategy for Ocean Exploration” (http://explore.noaa.gov/about/pres_panel_report.pdf) that led to creation of the NOAA Office of Ocean Exploration (**OE**).

NURP endorsed this new program and initially expected that it would be integrated with the existing NURP program. I believe that NOAA decided to keep the programs separate for a few reasons. At least initially, NOAA management wanted to control the types of projects supported, as opposed to allowing open peer-review to dictate the program direction. NOAA management was also concerned that the exploration-based objectives remain distinct from NURP's strategic (mission-related) research focus.

Should NURP and OE be merged?

Times have changed and now **NURP and OE should be authorized and merged**. HR 3835, as presented in Title I and Title II, lays out the focus and strengths of each program, and provides a foundation upon which NOAA can build a new, coordinated program. OE has established a solid community of users, reputation, and need for exploration science, and operates in global waters. The program encourages quests and queries that might not survive an NSF peer review competition, but often are led by NSF-sponsored investigators seeking to venture into poorly understood science and regions. However, as a NOAA program, it cannot afford to end its investigations by only asking questions. NURP's regional Centers conduct research and technology development to support NOAA's mission, particularly in the area of ecosystem-based management. The Centers have relationships at the regional level, with NOAA field offices, academic institutions, managers, and other state- and regional-level entities. The Centers also have expertise in undersea technologies needed in their regions, and in some cases provide those technologies themselves. A closer working partnership between OE and NURP will allow the regional programs to follow up on the OE explorations with more focused research that will serve NOAA's mandate to both understand and manage ocean resources.

Closing Remarks:

In closing, this authorization is long overdue. The Bill addresses the major weakness of the programs—under-funding and instability of funding. We seek to support cutting edge science projects using advanced technologies, wielded by the top scientists and technologists in the nation. Trying to accomplish this goal on a year-to-year uncertain funding cycle has been our major weakness. This is not how NIH, ONR, NSF or NASA, for example, support their research grant projects. With stable funding we can allow the science and technology development projects to mature to useful results, and attract the very best experts.

Previous attempts to authorize have been thwarted by political concerns more than need for the programs. HR 3835 lays the groundwork for a credible, long-lasting, and flexible national program of science, technology development, and ocean literacy. With your help and guidance, Mr. Chairman and Committee members, we can clear the final hurdles to authorizing these important national programs.

Thank you for the opportunity to participate in the Committee's deliberations.

ATTACHMENT: National Undersea Research Program-- Science Dive Activities FY 2003-2005

Research Center/Program	FY	Occupied Submersibles	Robotic Vehicles	Nitrox SCUBA	Participants	Institutes	Projects
Northeast U.S. and Great Lakes Center – <i>University of Connecticut</i>	05	4	81	0	87	40	17
	04	0	126	15	184	69	15
	03	7	99	100	212	78	17
Mid-Atlantic Bight Center – <i>Rutgers University</i>	05	0	9	143	110	16	10
	04	0	17	134	58	14	6
	03	0	18	140	62	12	8
Southeast U.S. and Gulf of Mexico Center – <i>University of North Carolina at Wilmington</i>	05	0	144	6481	344	90	43
	04	0	120	7503	333	104	41
	03	33	153	8984	287	28	41
Caribbean Marine Research Center – <i>Perry Institute of Marine Science</i>	05	11	0	3377	100	28	32
	04	0	0	4544	90	17	11
	03	0	0	3807	67	25	19
West Coast & Polar Region Center – <i>University of Alaska Fairbanks</i>	05	18	15	1588	69	27	9
	04	24	45	1195	181	44	17
	03	23	33	1230	91	32	15
Hawaii and Western Pacific Center -- <i>University of Hawaii</i>	05	71	19	0	68	29	12
	04	60	24	0	52	27	11
	03	81	68	0	32	14	9
TOTALS		332	971	39241	2427	694	333

